AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the above-referenced application.

Listing of Claims:

1-116. (cancelled)

117.(new) A method of forming a film of crystalline $YBa_2Cu_3O_7$ comprising:

forming a precursor film comprising barium (Ba), fluorine (F), yttrium (Y) and copper (Cu);

heat-treating said precursor film at a temperature above about 500°C. in the presence of oxygen and water vapor at sub-atmospheric pressure to form a crystalline structure; and

annealing said crystalline structure in the presence of oxygen.

118.(new) The method according to claim 117 wherein said precursor film is formed on a substrate.

119.(new) The method according to claim 118, wherein said substrate is a ceramic or a metal, alone or in combination.

120.(new) The method according to claim 119, wherein said substrate is $SrTiO_3$.

121.(new) The method according to claim 119, wherein said substrate is CeO_2.

122.(new) The method according to claim 119, wherein said substrate is chosen from the group MgO, $LaAlO_3$, Yttrium Stabilized Zirconia, ZrO_2.

123.(new) The method according to claim 119, wherein said substrate is chosen from the group Nickel, Ag, alloys comprising Nickel, alloys comprising Ag.

124.(new) The method according to claim 118 wherein said substrate is substantially single crystal.

125.(new) The method according to claim 117 wherein said heat-treating temperature is from about 500°C. to about 1000°C.

126.(new) The method according to claim 117 wherein said heat-treating atmosphere comprises oxygen and water vapor and additional gas chosen, alone or in combination, from the group nitrogen, argon or helium.

127.(new) The method according to claim 117 wherein said oxygen pressure during heat-treating is about 100 milliTorr.

128.(new) The method according to claim 117 wherein said $YBa_2Cu_3O_7$ film has a resistivity of from about 100 to about 600μOhm-cm at room temperature.

129.(new) The method according to claim 117 wherein said $YBa_2Cu_3O_7$ film has a critical current density measured at 77 K in a magnetic field of 1 Tesla of from about 0.01 MA/cm^2 or greater.

130.(new) The method according to claim 117 wherein during said heat-treating said $YBa_2Cu_3O_7$ film grows at a rate of from about 1 to about 20 Angstroms per second.

131.(new) The method according to claim 117, wherein said $YBa_2Cu_3O_7$ film has a thickness of from about 0.5 to about 10 microns.

132.(new) The method according to claim 117, wherein said $YBa_2Cu_3O_7$ film has a critical current density measured at 77 K of from about 0.1 MA/cm^2 or greater in zero magnetic field.

133.(new) The method according to claim 117, wherein said precursor film is formed on a substrate comprising $SrTiO_3$.

134.(new) The method according to claim 117 wherein said precursor film is formed, alone or in combination, by RF sputtering, DC sputtering, magnetron sputtering, thermal evaporation, electron beam evaporation, pulsed laser deposition, physical vapor deposition, metal organic deposition, spin coating, screen printing, spray coating, dip coating, chemical vapor deposition, metal organic chemical vapor deposition, plasma spraying.

135.(new) The method according to claim 117, wherein said crystalline structure is annealed at a temperature of from about 400°C. to about 650°C.

136.(new) The method according to claim 117 wherein said oxygen gas is chosen from the group nitrous oxide, ozone, oxygen alone or in combination.

137.(new) The method according to claim 117 wherein said precursor film is enclosed in a first container: the interior of said first container at sub-atmospheric pressure; where said first container is enclosed in a second container; said first container connected to said second container by a permeable structure; the interior of said second container at sub-atmospheric pressure.

138.(new) The method according to claim 137 wherein said alkaline earth element is chosen, alone or in combination, from the group magnesium (Mg), calcium (Ca), strontium (Sr), barium (Ba).

139.(new) The method according to claim 137 wherein said rare earth element is chosen, alone or in combination, from the group lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), samarium (Sm), europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy),), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb).

140.(new) A method of forming a film of crystalline (Rare Earth)$Ba_2Cu_3O_7$ comprising:

forming a precursor film comprising barium (Ba), fluorine (F), yttrium (Y) and copper (Cu); and rare earth element chosen, alone or in combination, from the group lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), samarium (Sm), europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb);

heat-treating said precursor film at a temperature above about 500°C. in the presence of oxygen and water vapor at sub-atmospheric pressure to form a crystalline structure; and

annealing said crystalline structure in the presence of oxygen.

141. (new) The method according to claim 140, wherein said precursor film is formed on a substrate.

142.(new) A method of forming a film of crystalline superconductor of the approximate composition (Rare Earth)$_1$(Alkaline Earth)$_2Cu_3O_7$ comprising:

forming a precursor film comprising at least one rare earth element, at least one alkaline earth element, fluorine (F), and copper (Cu);

heat-treating said precursor film at a temperature above about 500°C. in the presence of oxygen and water vapor at sub-atmospheric pressure to form a crystalline structure; and

annealing said crystalline structure in the presence of oxygen.

143.(new) A method of forming a film of crystalline $YBa_2Cu_3O_7$ comprising:

forming a precursor film comprising barium (Ba), fluorine (F), yttrium (Y) and copper (Cu);

heat-treating said precursor film at a temperature above about 700°C in the presence of oxygen and water vapor at sub-atmospheric pressure to form a crystalline structure; and

annealing said crystalline structure in the presence of oxygen.

144.(new) The method according to claim 143 wherein said precursor film is formed on a substrate.

145.(new) The method according to claim 144, wherein said substrate is a ceramic or a metal, alone or in combination.

146.(new) The method according to claim 145, wherein said substrate is $SrTiO_3$.

147.(new) The method according to claim 145, wherein said substrate is CeO_2.

148.(new) The method according to claim 145, wherein said substrate is chosen from the group MgO, $LaAlO_3$, Yttrium Stabilized Zirconia, ZrO_2.

149.(new) The method according to claim 145, wherein said substrate is chosen from the group Nickel, Ag, alloys comprising Nickel, alloys comprising Ag.

150.(new) The method according to claim 144 wherein said substrate is substantially single crystal.

151.(new) The method according to claim 143 wherein said heat-treating temperature is from about 700°C to about 900°C.

152.(new) The method according to claim 143 wherein said heat-treating atmosphere comprises oxygen and water vapor and nitrogen.

153.(new) The method according to claim 143 wherein said oxygen pressure during heat-treating is about 1 Torr or less.

154.(new) The method according to claim 143 wherein said oxygen pressure during heat-treating is about 0.3 Torr or less.

155.(new) The method according to claim 143 wherein said oxygen partial pressure during heat-treating is about 0.2 Torr or less.

156.(new) The method according to claim 143 wherein said $YBa_2Cu_3O_7$ film has a resistivity of from about 100 to about 600μOhm-cm at room temperature.

157.(new) The method according to claim 143 wherein said $YBa_2Cu_3O_7$ film has a critical current density measured at 77 K in a magnetic field of 1 Tesla of from about 0.01 MA/cm_2 or greater.

158.(new) The method according to claim 143 wherein during said heat-treating said $YBa_2Cu_3O_7$ film grows at a rate of from about 2.5 to about 20 Angstroms per second.

159.(new) The method according to claim 143, wherein said $YBa_2Cu_3O_7$ film has a thickness of at least about 0.5 microns.

160.(new) The method according to claim 143, wherein said $YBa_2Cu_3O_7$ film has a critical current density measured at 77 K of from about 0.1 MA/cm^2 or greater in zero magnetic field.

161.(new) The method according to claim 143, wherein said precursor film is formed on a substrate comprising $SrTiO_3$.

162.(new) The method according to claim 143 wherein said precursor film is formed, alone or in combination, by magnetron sputtering, electron beam evaporation, spin coating, dip coating, chemical vapor deposition, metal organic chemical vapor deposition.

163.(new) The method according to claim 143, wherein said crystalline structure is annealed at a temperature of from about 700°C. to about 900°C.

164.(new) The method according to claim 143 wherein said oxygen gas is oxygen.

165.(new) The method according to claim 143 wherein said precursor film is enclosed in a first container: the interior of said first container at sub-atmospheric pressure; where said first container is enclosed in a second container; said first container connected to said second

container by a permeable structure; the interior of said second container at sub-atmospheric pressure.

166.(new) The method according to claim 143 wherein said alkaline earth element is chosen, alone or in combination, from the group calcium (Ca), strontium (Sr), barium (Ba).

167.(new) The method according to claim 143 wherein said rare earth element is chosen, alone or in combination, from the group lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), samarium (Sm), europium (Eu), gadolinium (Gd), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb).

168.(new) A method of forming a film of crystalline (Rare Earth)$Ba_2Cu_3O_7$ comprising:

forming a precursor film comprising barium (Ba), fluorine (F), yttrium (Y) and copper (Cu); and rare earth element chosen, alone or in combination, from the group lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), samarium (Sm), europium (Eu), gadolinium (Gd), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb);

heat-treating said precursor film at a temperature above about 500°C. in the presence of oxygen and water vapor at sub-atmospheric pressure to form a crystalline structure; and

annealing said crystalline structure in the presence of oxygen.

169.(new) The method according to claim 168 wherein said precursor film is formed on a substrate.

170.(new) A method of forming a film of crystalline superconductor of the approximate composition (Rare Earth)$_1$(Alkaline Earth)$_2Cu_3O_7$ comprising:

forming a precursor film comprising at least one rare earth element, at least one alkaline earth element, fluorine (F), and copper (Cu);

heat-treating said precursor film at a temperature above about 700°C in the presence of oxygen and water vapor at sub-atmospheric pressure to form a crystalline structure; and

annealing said crystalline structure in the presence of oxygen.